

of *Natural Sciences of Philadelphia*, 1900, page 77, plate 1, figure 1. Your smaller specimen is a male; the larger one probably is a female. Your specimens differ from *villosa* in several particulars: yours is proportionally longer, and has the posterior ridge subangulate. A prominent difference is the character of the posterior margin. In *villosa* it is almost uniformly rounded, but in your species it is distinctly three-angled on the posterior margin. Two of the angles are due to well-marked riblets on the posterior area, and the third angle is at the terminus of the posterior ridge. The angles are more easily seen in an anterior view. Your shells certainly are subspecifically and probably specifically distinct from *L. villosa*. I have seen no specimens of *Lampsilis wrightiana* Frierson, a species of this same general group, but from the description, it seems to be different from your shell." If Mr. Marshall had seen the young of *jonesi* (fig. 2), he would have noted that the species is closely related to *Lampsilis subangulata* (Lea), a species occurring with *jonesi* in the Pea River and Choctawhatchee River drainages. *L. jonesi* differs distinctly from *subangulata* in that it has a prominent posterior biangulation and posterior ridge; it is not nearly so brightly rayed; the lower margin is not so distinctly rounded; and the teeth are more stumpy and jagged.

PSAMMODULUS, A NEW MIDDLE MIOCENE MODULID FROM
THE ISTHMUS OF TEHUANTEPEC, MEXICO

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Abstract.—This paper describes and figures *Psammodulus mexicanus*, a new genus and species of gastropod from the middle Miocene marine beds of Santa Rosa, Vera Cruz, Isthmus of Tehuantepec, Mexico. The outstanding characteristic of this curious mollusk, is the habit of cementing foreign particles to the surface of the spire like the well

known genus *Xenophora*. The aperture and ornamentation on the base of the shell suggest that *Psammmodulus* is probably a near relative of *Modulus*.

The middle Miocene marine fauna from Santa Rosa, Vera Cruz, on the Isthmus of Tehuantepec, Mexico, contains a small shell that is quite distinct from any fossil or Recent gastropod genus with which I am acquainted. The aperture and sculpture on the base of the shell simulate the genus *Modulus* of Gray, but the spire is covered by agglutinated sand grains which suggests relationship with *Xenophora* of Fischer de Waldheim. Similarity to the latter group however, is limited entirely to the habit of attaching foreign bodies to the spire of the shell. In all other features the Mexican specimens appear to be closely related to *Modulus*. From the habit of attaching sand grains to the shell surface this new gastropod is designated *Psammmodulus*.

PSAMMODULUS MEXICANUS, new genus and species. Pl. 13, fig. 4.

Shell small, relatively heavy, turbinate. Nucleus slender consisting of about two smooth whorls, below which the spire is covered by agglutinated sand grains or by pits in the shell surface from which the grains have been lost. Grains more or less oriented in oblique rows that are roughly parallel to the outer margin of the aperture. Suture distinct. Aperture subcircular, oblique to axis of the shell. Columella bearing a well defined basal, horizontal tooth below which lies an excavated area. Margin of inner lip slightly reflected. Parietal callus relatively heavy. Interior of outer lip bearing about ten fine lirations. Sculpture of base consisting of about eight strong spiral cords with fine spiral threads on the interspaces. Spiral sculpture crossed by faint, unevenly developed axial threads.

Figured type: Length 3.4 mm., diameter 2.5 mm.

The apical whorls are not all preserved on the type specimen, therefore the apex appears rather blunt in the figure. Some specimens have a well defined, but narrow umbilicus, others have the umbilical opening very nearly obscured by the margin of the inner lip and there are also slight variations in the taper of the spire and the strength of the columellar tooth.

At first glance this shell appears to be a young *Modulus* somewhat similar to *Modulus modulus basileus* (Guppy) described and figured by Woodring¹ from the Bowden beds, middle Miocene of Jamaica, that through some freak of fossilization has had sand grains cemented to the spire surface, but not on the base of the shell. However, the following evidence is deemed sufficient to prove that the Mexican shell is a new and distinct form. There are seventy specimens in the collection and all of them show the same general characters. The Santa Rosa sediment consists of soft friable sand with minor amounts of shell and other organic fragments and the grains range in size from fine silt to coarse grit. From this variety of material the creature appears to have selected and used on the surface of the shell, at any particular place, grains that are roughly of the same general size. The foreign material is composed entirely of mineral matter, not a single shell or other organic fragment was noted on any one of the lot of specimens. Many of the grains are clear quartz and the particles on the earlier, smaller whorls are quite definitely smaller than those on the later whorls. The grains are oriented more or less in rows parallel with the shell aperture. The body whorl is rounded and the spiral sculpture of the base begins at a point well below the periphery of the shell. The sand grains are present on the body whorl from the suture to the upper spiral cord of the base and in only a very few specimens is there so much as a single grain below the first spiral. As a final bit of evidence, there are two small shells in the Santa Rosa collections, of a typical *Modulus*, which appears to be the same species as that described by Woodring from Bowden. These specimens resemble most closely the specimen pictured on plate 26, figures 1 and 2, of Woodring's work. They are about 3 mm. in diameter, or in other words, of comparable size to the shells of *Psammmodulus*.

¹ Woodring, W. P. Miocene Mollusks from Bowden, Jamaica. Part 2, Gastropods, Carnegie Inst. Washington, Pub. 385, pp. 343-344, pl. 25, fig. 17, pl. 26, figs. 1-4, 1928.

There seems to have been in this new gastropod, a curious specialization of that part of the mantle lying below the suture of the shell and above the first spiral on the base. That part of the mantle not only deposited shell material, but also apparently had a peculiar affinity for mineral grains which were picked up, held in position and cemented firmly in the matrix during periods of shell enlargement.

NEW CUBAN LAND SHELLS FROM ORIENTE AND
CAMAGUEY PROVINCES

BY D'ALTE ALDRIDGE WELCH

(Concluded from page 108)

OPISTHOSIPHON (OPISTHOSIPHON) ANDREWSI Welch. Pl. 11, fig. 5.

The shell is thin, oblong conic, the suture well impressed, umbilicate, truncate, leaving $3\frac{1}{2}$ convex whorls, nonsolute. The color is cinnamon-buff, but in the paratypes is light pinkish cinnamon, cinnamon or snuff brown. The sculpture consists of hollow axial ribs quite widely spaced, the early whorls being more closely ornamented than the later. Parallel to these ribs are a few thin threads, and in line with these are low crinkly strae, seen only under the microscope, covering the ground. The spiral sculpture is made up of faint regularly set thickenings of the ground appearing strongest on the last whorl; also the bulbular projections at the summit of the ribs on their touching the suture, giving the later a crenulated appearance. About the umbilicus there are three rows of tubercles similar to those about the suture, the outer row is larger than the inner ones. The aperture is oval, the peristome double, the inner portion projects slightly, is narrow and a little indented at the posterior angle; the outer broadly expanded, fluted, coarsely sculptured with radiating ribs. Near the umbilicus it is adnate to the whorl above, at the posterior angle the peristome is deflected backwards on touching the penultimate whorl and ends in a siphon which bends downwards into the suture just back of the aperture. The internal connection of the siphon is just inside the aperture at the posterior margin. The operculum is typical of the genus.